DOCUMENT RESUME

ED 448 719 IR 020 482

AUTHOR Howland, Jane; Mayer, Christine
TITLE Tools of Innovation: Supporting Change through Online Web Solutions.
PUB DATE 1999-10-00
NOTE 7p.; In: WebNet 99 World Conference on the WWW and Internet Proceedings (Honolulu, Hawaii, October 24-30, 1999); see IR 020 454.
PUB TYPE Reports - Descriptive (141) -- Speeches/Meeting Papers (150)
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Adoption (Ideas); *Computer Uses in Education; Distance Education; *Educational Technology; Elementary Secondary Education; Higher Education; *Instructional Innovation; Preservice Teacher Education; Problem Based Learning; Questionnaires; *World Wide Web
IDENTIFIERS Learning Environments; Stages of Concern about the Innovation; Technology Implementation; *Technology Plans; *Technology Utilization; University of Missouri Columbia; Web Sites

ABSTRACT

This paper discusses online tools that support an essential element of technology planning--the staff responsible for integrating technology in their curricula. Two solutions using different strategies to address the critical area of support for technology implementers are examined, i.e., the online Stages of Concern about the Innovation Questionnaire (SoCQ) and TechConnect. The SoCQ tool assesses staff concerns about innovation use as a first step in identifying and developing appropriate assistance. Two applications of use of the SoCQ are described: preservice administrators using an online problem-based learning environment, and teachers implementing online curriculum. TechConnect, a World Wide Web site for sharing stories about technology use in educational environments, illustrates a mechanism for supporting change and technology use through creating a networked community of users. The development and use of these change tools at Planet Innovation is also described. Planet Innovation is a grant-funded organization at the University of Missouri-Columbia that offers online solutions for technology planning and implementation, especially in K-12 schools. (Contains 19 references.) (MES)

Reproductions supplied by EDRS are the best that can be made
from the original document.

ED 448 719

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY

G.H. Marks

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

This document has been reproduced as received from the person or organization originating it.

Minor changes have been made to improve reproduction quality.

Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

Tools of Innovation: Supporting Change Through Online Web Solutions

Jane Howland
Center for Technology Innovations in Education, University of Missouri-Columbia, U.S.A.
jane@coe.missouri.edu

Christine Mayer
Center for Technology Innovations in Education, University of Missouri-Columbia, U.S.A.
mayer@coe.missouri.edu

Abstract: Educational institutions have long been involved in planning and implementing new initiatives, but with the profusion of technology innovations, the race to stay ahead of the game has intensified. Planet Innovation is a grant-funded organization offering online solutions for technology planning and implementation, especially in K-12 schools. This paper will discuss two online tools that support an essential element of technology planning - the staff responsible for integrating technology in their curricula. A web-based instrument for measuring concerns about adopting innovations and the development of a user-centered web site designed for communicating technology stories and networking among teachers will be described.

Introduction

Educational institutions have long been involved in planning and implementing new initiatives, but with the profusion of technology innovations, the race to stay ahead of the game has intensified. In today's climate of rapid change, Wall says it is "difficult for anyone outside the industry to stay current" [Wall 1994]. Technology planners face a number of issues in making decisions about technology acquisition, implementation, and evaluation. Among them are nuts and bolts decisions concerning types of networking and equipment, software, and access [Fries & Monahan 1998; Rennie 1996]. Ongoing cost considerations for upgrades and maintenance are essential, yet often overlooked [Davis 1995].

However, providing technology equipment is only the beginning. Sustaining the human infrastructure that shapes the equipment into tools of learning is vital. Too frequently, we find schools equipped with adequate hardware and software that is virtually unused. Equally disheartening is finding the school where technology is being misused. Instances abound:

- Computer labs where technology is seen as separate from everyday learning activities and classes are scheduled for routine lab time.
- Teachers who use computers as little more than a time-filler for students who have completed their work or who offer computer game time as a reward for desired behavior.
- Instructional methods that waste technology's potential by offering the equivalent of electronic worksheets.

This paper will discuss online solutions that support an essential element of technology planning - the staff responsible for integrating technology in their curricula [Strudler 1993; Weiss 1996]. For optimum use of technology to occur, many components must be in place. Shared vision, adequate training and support, sufficient infrastructure - all are vital for full utilization of technology's capacity [Wedman, Laffey, Andrews, Musser, Diggs, & Diel, 1998]. And, "at the center of it all, 'headware,' not hardware, is the central element in the successful development of an effective, coherent, and cohesive long-range plan for technology in K-12 schools" [Jukes 1996]. Ultimately, student success is the goal of both administrators and teachers. Yet success does not happen accidentally.

We will describe the development and application of web-based tools that support reflective decision-making, change and ultimately, success. Two solutions using two different strategies to

IR020482

BEST COPY AVAILABLE

address the critical area of support for technology implementers will be examined. The online Stages of Concern About the Innovation Questionnaire (SoCQ) tool assesses staff concerns about innovation use as a first step in identifying and developing appropriate assistance. TechConnect, a web site for sharing stories about technology use in educational environments, illustrates a mechanism for supporting change and technology use through creating a networked community of users.

Planet Innovation

To understand the development of these two change tools, it is helpful to situate their origins. Since 1995, Planet Innovation has been part of the Center for Technology Innovations in Education (CTIE), which operates on the University of Missouri-Columbia's College of Education campus. The purpose of the Center is to engage in research and development dedicated to the innovation of new technologies for the support of teaching and learning. Planet Innovation grew from the U.S. Department of Education's establishment of the Regional Technology in Education Consortia (R*TEC) program, whose goal is improving student achievement through technology. The R*TEC emphasis is on improving teaching and learning, professional development, and infrastructure development. A unique feature of the R*TECs, in contrast with similar organizations, is their exclusive focus on effective technology use to support school reform [U.S. Department of Education 1998].

During early regional planning, the South Central R*TEC (SCR*TEC) identified online delivery as an emerging vehicle allowing asynchronous, wide distribution of information and learning resources. Initially, SCR*TEC's Planet Innovation specifically targeted administrators, technology coordinators, and other leaders involved in technology planning. The charge to use technology for driving school reform led to this decision. For real change to occur on a systemic level, in this case on the district or building level, it is critical that individuals in leadership roles make informed decisions. Change can and does occur in one classroom at a time, but is more likely to occur in a community that shares common goals and vision. To support decision-makers, Planet Innovation designed a web site offering tools that assist in technology planning, implementation, and evaluation.

Scheduling conflicts, time constraints, and distance barriers are limitations that may prevent groups of decision-makers from communicating effectively. To facilitate this process, Planet Innovation envisioned an on-demand web environment based on a model of "Right-Time, Right-Place, Right-Form" [Wedman et al. 1998]. This meant that technology planners could choose appropriate web solutions based on their individual needs and, if desired, form groups to work in a distributed environment. Participation in an online group is not contingent on physical location or precise time frames, with group members free to choose the most convenient time and place for collaborating with others. Among the online tools developed to assist the planning and decision-making proces· were a Group Calendar, Group Survey Creator, Delphi Planning System for group consensus building, and Stages of Concern About the Innovation Questionnaire (SoCQ).

Measuring Concerns About Adopting Innovations

One of the primary issues facing individuals responsible for facilitating innovations involves human nature more than the innovation itself. Individuals are often resistant to change, and many innovations fail because those in charge have neglected to adequately consider the people affected. Teachers are frequently expected to integrate new technologies and adapt their instruction, often with inadequate time, training, or information about the innovation's effect on their teaching or students.

Network connectivity has ushered in new possibilities for learning, with the potential of forever changing the way we think about the traditional school environment. While some individuals embrace these changes, others are less enthusiastic about adopting innovations. Hassinger, as

described in [Rogers 1995], contends that people are open to an innovation only when they have a need that the innovation will fill. Even then, unless the innovation is relevant to that need, as well as consistent with the person's belief system, there will be little effect.

Change is a complex process involving not only the innovation, but also the growth of individuals *over time* as they implement the change [Hord, Rutherford, Huling-Austin, & Hall 1987]. Hord et al., describe common mistakes leading to innovation failure. Among them is the tendency to provide initial training without follow-up monitoring and additional help. A second mistake is viewing as identical all the individuals involved with the change instead of realizing that each individual will react uniquely to the innovation. The Concerns-Based Adoption Model (CBAM) was designed with the belief that the individuals affected by change are the most important factor in the change process [Hord et al. 1987]. The model provides tools that enable a change facilitator to offer support and interventions in a flexible, yet systematic, process.

A central part of the CBAM is the 35-item Stages of Concern About the Innovation Questionnaire that measures the current concerns of a person encountering change. Concerns are defined as "the feelings, attitudes, thoughts, or reactions an individual has related to a specified program or practice" [Rutherford, Hord, & Thurber 1984]. Statements are rated using a Likert scale with dimensions ranging from "irrelevant," or "not true of me now" to "very true of me now." The responses fall into one of seven stages. These stages consist of concerns about the innovation itself, concerns about effects it may have on the person responsible for implementing it, concerns about consequences it may have for students, and concerns about ways users can collaborate or extend the innovation.

The CBAM was developed through extensive research at the University of Texas in Austin to "conceptualize and facilitate educational change" [Hall, George, & Rutherford 1979]. Planet Innovation was granted permission to develop an online version of the Stages of Concern About the Innovation Questionnaire that could be administered either to a single user or to a group of educators. The tool was designed to calculate scores for each stage and display a graph representing each individual's position in each of the stages. Anyone who registers on the Planet Innovation web site has free access to creating groups and administering this survey instrument.

To begin a group survey, the innovation for which the statements are to be answered is entered into a text field. The group creator then builds the group by entering individuals' e-mail addresses in the Group Population Tool. This utility is used for all Planet Innovation tools that involve group collaboration or action. Next, an automatic e-mail is generated, prompting each group member to log-in to the Planet Innovation web site where they will find a notification linking them to the SoCQ. Upon completion of the survey questions, the data is automatically analyzed and available to the group creator. The results include individuals' scores in each of the seven stages of concern and a group graph representing each individual's results displayed in a different color. Thus, individual profiles may be examined as well as compared with others who are involved with the innovation.

The Stages of Concern Tool: Two Applications of Use

Pre-Service Administrators Using an Online Problem-Based Learning Environment

Because change facilitators are often educators in leadership positions, the following use of the SoCQ tool is of particular significance. To familiarize pre-service administrators with support tools for innovation adoption, the Information Environment for School Leader Preparation (IESLP) project is utilizing Planet Innovation's online SoCQ tool.

IESLP is a web-delivered, problem-based learning environment preparing students for leadership roles in education. Problem exercises and information environments are available to IESLP users, who access actual school data that has been entered with name changes to protect anonymity. Complicators for a situation may be introduced that keep the conditions fluid and changing, as would be expected in actual situations. Computers are used as information and communication tools for IESLP work groups, which are modeled after teams of education administrators as found in real-life settings.

Students have the opportunity to engage in practical problem solving, make proactive leadership decisions, and gain valuable insight into the responsibilities and competencies necessary for education administrators. The rationale behind IESLP is the endeavor to bring about fundamental change in school leader preparation. Rather than train leaders in a reactive or "in-basket" model, IESLP strives to change the underlying thinking of these individuals and to reform the way administrators approach their profession. Active "problem-finding" is emphasized, encouraging leaders to reflect and engage in identification of problems and opportunities [Mayer, Crawford, & Forsyth 1998]. IESLP learning modules may position students as administrators who seek to implement technology innovations or other changes in their schools. To underscore the importance of understanding the attitudes and readiness of staff members to adopt an innovation, IESLP turned to Planet Innovation's SoCQ tool.

As the tool was originally developed, only the group creator could view results for the entire group. Individual group members were allowed access only to their own results. Because IESLP students needed to understand how the tool works, adaptations were requested that would allow all members of a SoCQ group to view the entire group's results instead of giving that capacity only to the group's creator. Planet Innovation programmers modified the tool to allow a group creator the option for this level of permission when setting up a group SoCQ. Next, programmers set up a simulated group based on real-life data that IESLP provided.

IESLP's cohort groups are now able to use the SoCQ results to analyze staff needs and concerns about adopting innovations and to develop mediating support strategies. Knowledge of a tool that measures innovation adoption concerns and is easily accessed for online administration and scoring increases the likelihood that these pre-service administrators will remain aware of individual staff concerns as they implement changes as in-service administrators.

Teachers Implementing Online Curriculum

To illustrate a second application of the SoCQ tool, we next examine a small rural school district that acquired unlimited access to a commercial online curriculum program as a result of its membership in an educational consortium. Although the online curriculum had great potential and might have been highly successful in some schools, it was underutilized in this particular setting. Why? Several factors may have contributed to the situation.

First, the majority of the teachers had not identified the need for a resource such as the online curriculum. Second, the teachers were not integral to the planning process. Instead, the online program was presented with an initial training session and teachers were left to implement the program or not as they saw fit. Little follow-up or support was forthcoming. Clearly, a well-thought out process for initiating and sustaining this innovation was lacking. Third, it is possible that teacher beliefs about the efficacy or value of the program affected their level of adoption. If this innovation did not mesh with their attitudes about using packaged lesson plans, if they perceived the materials as lower quality than their current instructional materials, or if they found the mechanics of accessing the material online prohibitive, then non-adoption would be expected [Rogers 1995].

A group of seven teachers agreed to fill out the web-based Stages of Concern About the Innovation Questionnaire. Analysis of the results from this survey indicated that several individuals were not yet in the implementation stages, but had concerns regarding how to use the online curriculum and how it would personally affect them in regard to time and logistics. Until these concerns were recognized and appropriate support given, the teachers were unlikely to change their present teaching methods and adopt the online curriculum.

Issues of individual concerns are essential for change agents, who are often school administrators, to keep in mind as they plan for policy and implementation. In each of the stages of concern, there are identifiable strategies and assistance that a change facilitator can offer. Identifying concerns and offering support mechanisms increases the likelihood of the innovation's success [Hord et al. 1987]. Taking advantage of tools such as the online SoCQ gives change facilitators crucial information that is instrumental in successful adoption of innovations.

TechConnect

In studying professional development, a distinction is made between change driven by administrators and change agents and "bottom-up" movements that focus on the teachers involved in the change [Pennell & Firestone 1996]. Historically, teachers have been isolated in closed classrooms with little time or opportunity to collaborate or share their experiences. Recently, however, teacher networks have become powerful vehicles that encourage and value exchange among participants [Lieberman & McLaughlin 1992]. Face-to-face networks, while effective, encounter the constraints of time and physical proximity. This type of network is no longer the only model, as online social networks are developing that support collaboration and connection among teachers [Wellman, Salaff, Dimitrova, Garton, Gulia, & Haythornthwaite 1996; Reilly 1999]. Online networks can foster the "bottom-up" diffusion of ideas about using technology among teachers. The traditional barriers encouraging isolation are removed and change can occur in a grassroots method. A key concept in successful online communities is empowerment [Palloff & Pratt 1999].

Planet Innovation's goal in creating its companion web site, TechConnect, is to provide a networked community for sharing technology stories whose design is driven by the educators it serves. To achieve this, we initially surveyed 83 teachers to determine their preferences in content, delivery, and submission mechanisms. Although as developers, our initial plan was heavy reliance on audio as the delivery medium, 85% of those surveyed preferred a mixture that included text. Likewise, the preliminary plan for an automated recording system for teachers to submit technology stories was postponed because only 10% of those surveyed indicated the preference to submit information using this technique. Over one-half of the teachers preferred entering their stories in an online form. Of the teachers who responded to the question regarding their type of Internet access, one-third had 56K modems and one-third had Ethernet access. Since less than 20% of the respondents accessed the Internet using a 28.8K modem or less, streaming audio and video are options provided on many stories to enhance the user's experience.

At this time, teachers are beginning to offer their stories and we remain attuned to their needs in further developing the web site. Usability testing has occurred on a small scale and will continue. Future plans include additional online workshops with subjects determined by the users, a chat function to supplement the bulletin boards, and featured guests. Research goals focus on assessing the effectiveness of this approach in increasing technology integration in learning situations.

Conclusion

A key to successful change and innovation adoption lies within the individuals affected by that change. Support for those involved is a vital component of successful change and may include strategies that are initiated at the change facilitator level or that are generated by the individuals themselves. The online Stages of Concern About the Innovation Questionnaire is a proven tool that makes appropriate support strategies possible by identifying the current concerns of an individual regarding change in which he/she is involved. A second model of support is exemplified by TechConnect, which uses an online environment to create support through communication and collaboration. Web-based tools such as these offer increased possibilities for change by overcoming barriers and fostering connections.

References

[Davis 1995] Davis, M. D. (1995). A policy "pothole" in instructional computer planning. *Journal of Curriculum & Supervision*, 10 (3), 278-282.

[Fries & Monahan 1998] Fries, B. & Monahan, B. (1998). School district technology planning in an era of rapid change. *Educational Technology*, 38 (1), 60-62.
[Hall, George, & Rutherford 1979] Hall, G., George, A., & Rutherford, W. (1979). *Measuring stages of concern about the innovation: a manual for use of the soc questionnaire*. (R & D Report No. 3032). Austin: University of Texas, The Research and Development Center for Teacher Education.
[Hord, Rutherford, Huling-Austin, & Hall 1987]; [Hord et al. 1987] Hord, S., Rutherford, W., Huling-Austin L., & Hall, G. (1987). *Taking charge of change*. Austin: Southwest Educational Development Laboratory.
[Jukes 1996] Jukes, I. (1996). The essential steps of technology planning. *School Administrator*, 53 (4), 8-14.
[Lieberman & McLaughlin 1992] Lieberman, A. & McLaughlin, M. (1992). Networks for educational change: powerful and Problematic. *Phi Delta Kappan*, 73, 673-677.
[Mayer, Crawford, & Forsyth 1998] Mayer, C., Crawford, J., & Forsyth, P. (1998). *The information environment for school leadership preparation instructor guide*. Columbia: University of Missouri, University Council for Educational Administration.
[Palloff & Pratt 1999] Palloff, R. & Pratt, K. (1999). *Building learning communities in cyberspace*. San Francisco, CA: Jossey-Bass Inc.
[Pennell & Firestone 1996] Pennell, J. & Firestone, W. (1996). Changing classroom practices through teacher networks: matching program features with teacher characteristics and circumstances. *Teachers College Record*, 98 (1), 46-76.
[Reilly 1999] Reilly, R. (1999). EdNet@UMass: providing quality professional development via the internet. *T.H.E. Journal*, 26 (8), 60.
[Rennie 1996] Rennie, R. J. (1996). Information technology's role in educational organizations. *School Business Affairs*, 62 (2), 44, 46-47.
[Rogers 1995] Rogers, E. M. (1995). *Diffusion of innovations*. (Fourth ed.). New York: The Free Press.
[Rutherford, Hord, & Thurber 1984] Rutherford, W., Hord, S. & Thurber, J. (1984). Preparing principals for leadership roles in school improvement. *Education and Urban Society*, 17 (1), 29-48.
[Strudler 1993] Strudler, N. (1993). Staff development and technology: a position paper. *Journal of Computing in Teacher Education*, 9 (4), 8-10.
[U.S. Department of Education 1998] U.S. Department of Education. (1998). Network of regional technology in education consortia. *http://rtec.org/* (22 Feb. 1999).
[Wall 1994] Wall, T. J. (1994). A technology planning primer. *American School Board Journal*, 181 (3), 45-49.
[Wedman, Laffey, Andrews, Musser, Diggs, & Diel, 1998] Wedman, J., Laffey, J., Andrews, R., Musser, D., Diggs, L., & Diel, L. (1998). Building technology infrastructure and enterprises in a college of education: Increasing Performance Capacity. *Educational Technology*, 38 (5), 12-19.
[Weiss 1996] Weiss, A. M. (1996). System 2000: if you build it, can you manage it? *Phi Delta Kappan*, 77 (6), 408-415.
[Wellman, Salaff, Dimitrova, Garton, Gulia, & Haythornthwaite 1996; Reilly 1999] Wellman, B., Salaff, J., Dimitrova, D., Garton, L., Gulia, M., & Haythornthwaite, C. (1996). Computer networks as social networks: collaborative work, telework, and virtual community. *Annual Review of Sociology, 1996*, 22, 213-239.